

## SUPPLEMENTARY MATERIALS

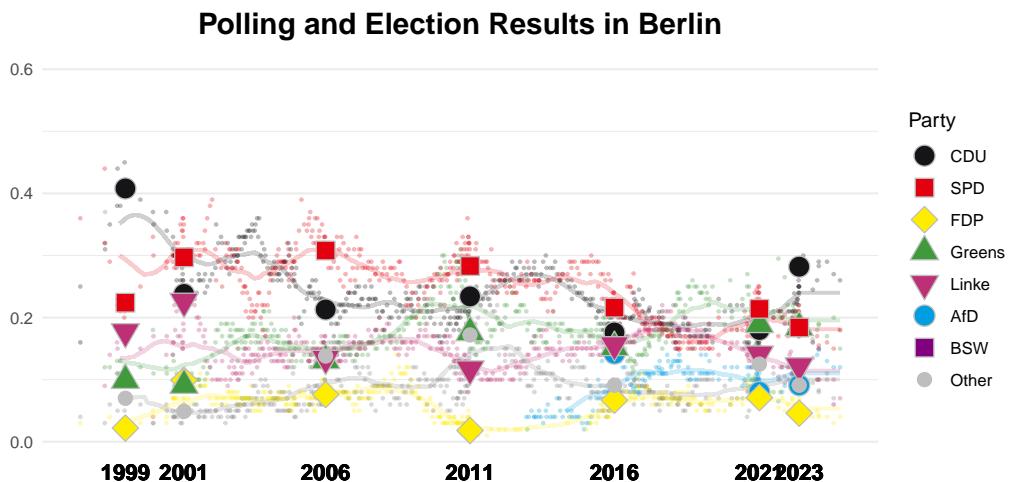
# An Election Forecasting Model for Subnational Elections

March 14, 2025

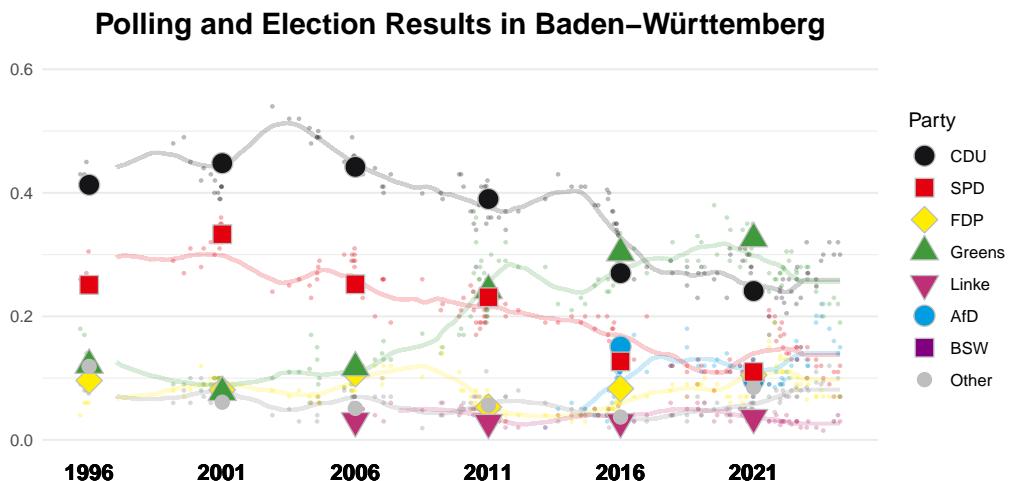
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## A. Polling and Election Results

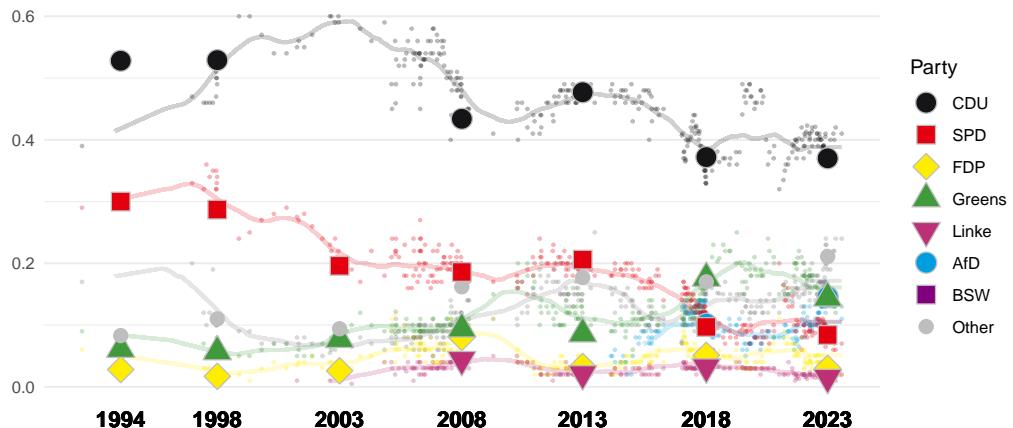


**Figure A.1.** Polls and election results over time for Berlin. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls.



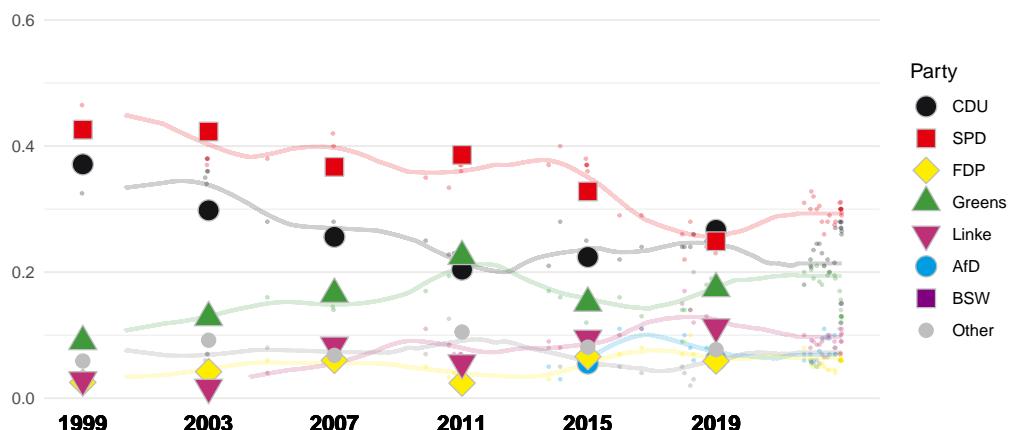
**Figure A.2.** Polls and election results over time for Baden-Württemberg. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls.

### Polling and Election Results in Bavaria



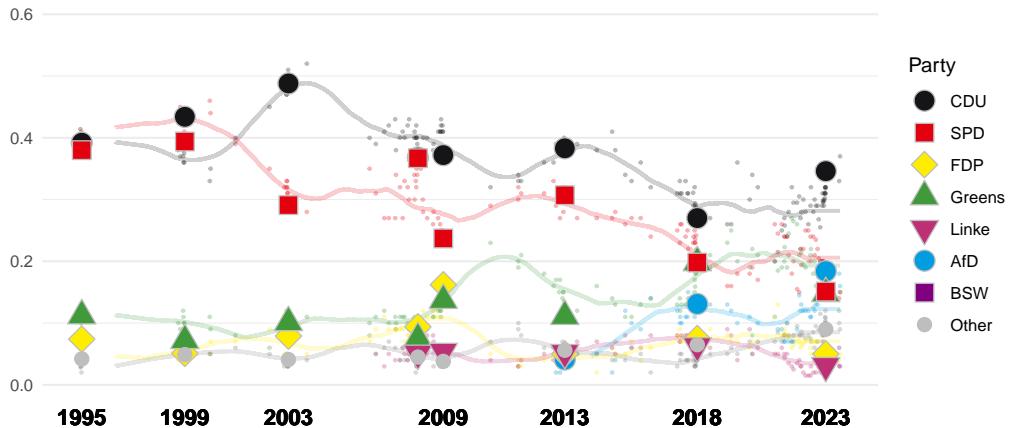
**Figure A.3.** Polls and election results over time for Bavaria. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls. Note that CDU refers to CSU in Bavaria.

### Polling and Election Results in Bremen



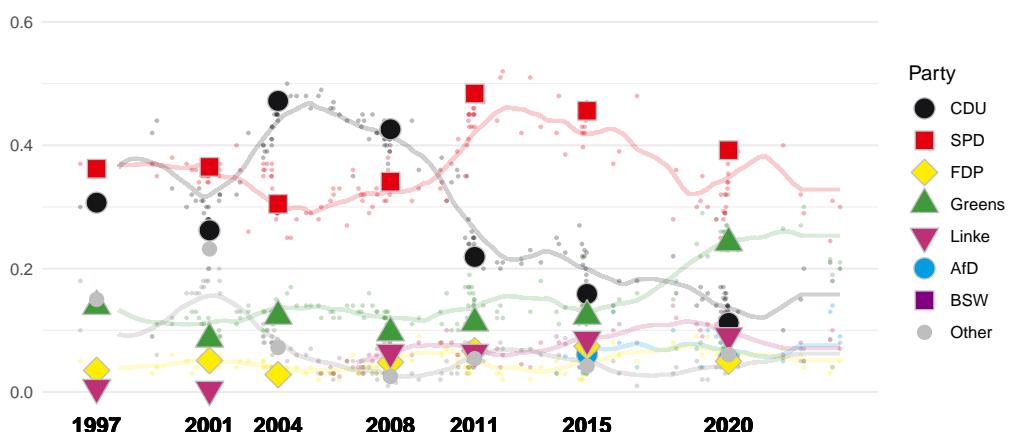
**Figure A.4.** Polls and election results over time for Bremen. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls.

## Polling and Election Results in Hesse



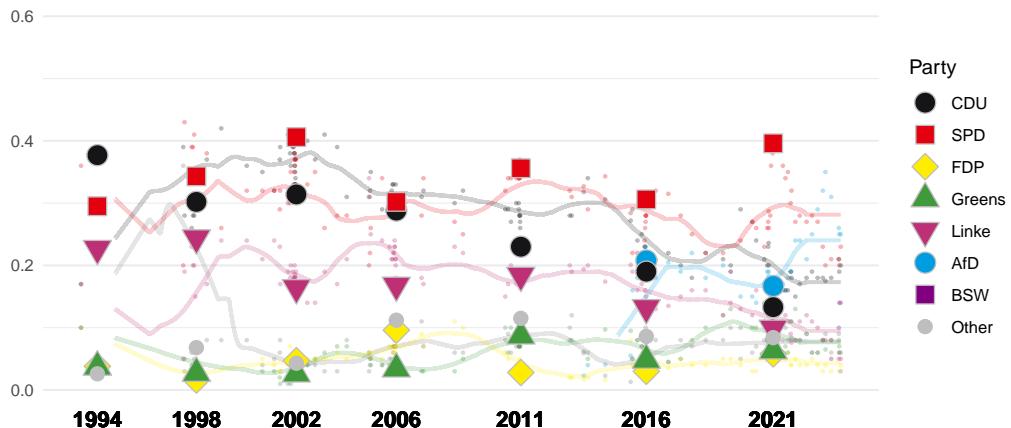
**Figure A.5.** Polls and election results over time for Hesse. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls.

## Polling and Election Results in Hamburg



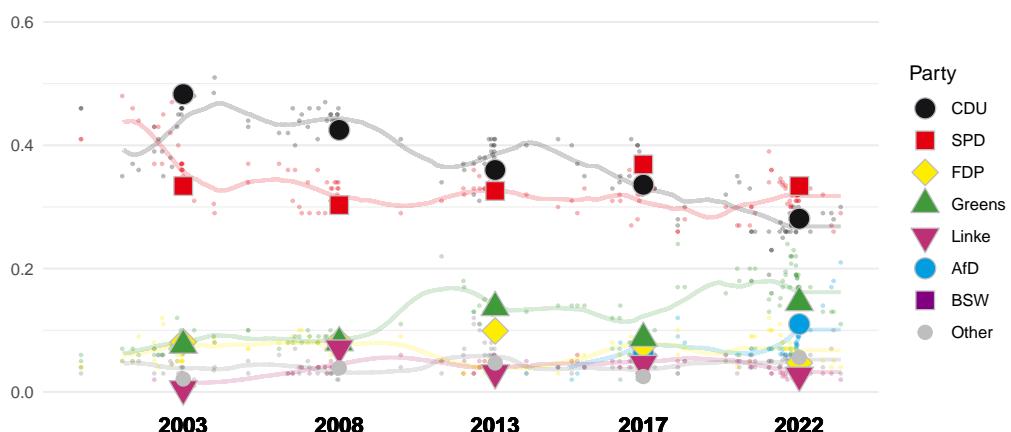
**Figure A.6.** Polls and election results over time for Hamburg. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls.

## Polling and Election Results in Mecklenburg-Vorpommern



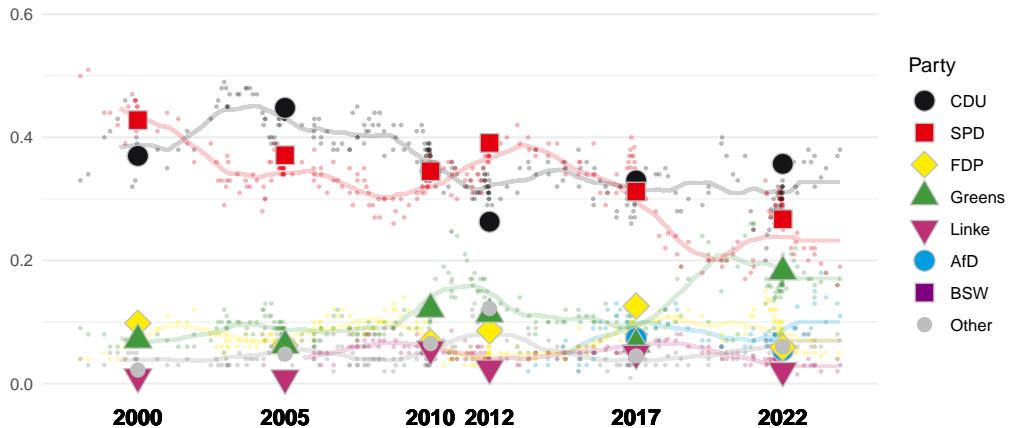
**Figure A.7.** Polls and election results over time for Mecklenburg-Vorpommern. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls.

## Polling and Election Results in Lower Saxony



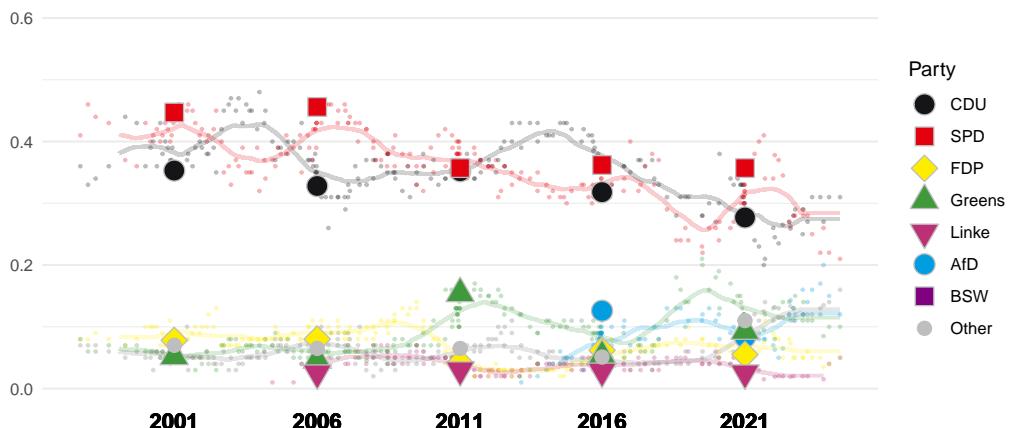
**Figure A.8.** Polls and election results over time for Lower Saxony. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls.

## Polling and Election Results in North Rhine-Westphalia



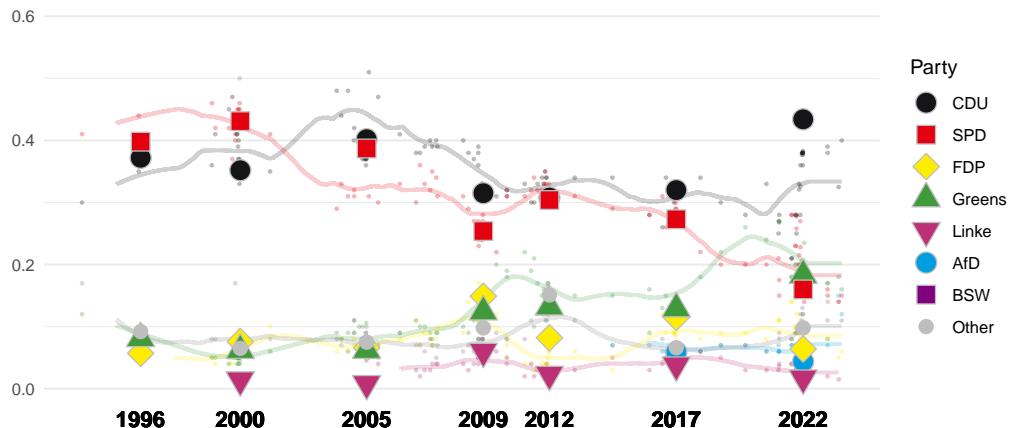
**Figure A.9.** Polls and election results over time for North Rhine-Westphalia. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls.

## Polling and Election Results in Rhineland-Palatinate



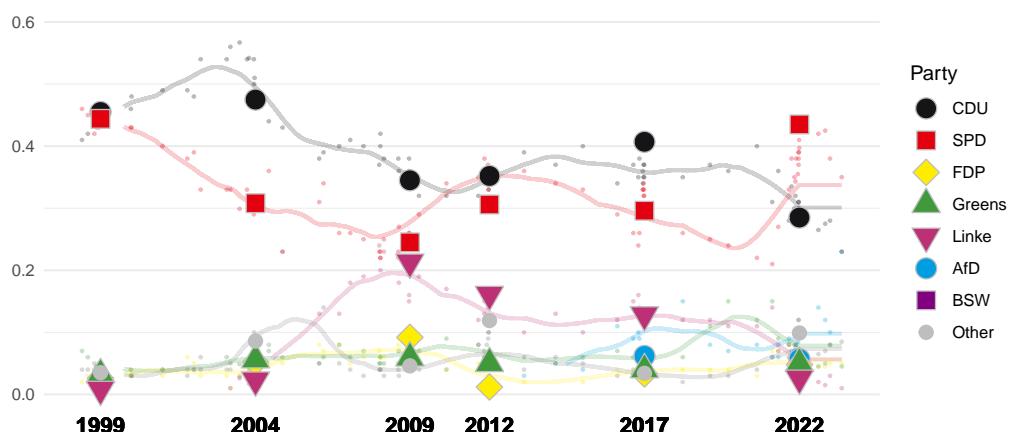
**Figure A.10.** Polls and election results over time for Rhineland-Palatinate. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls.

## Polling and Election Results in Schleswig-Holstein



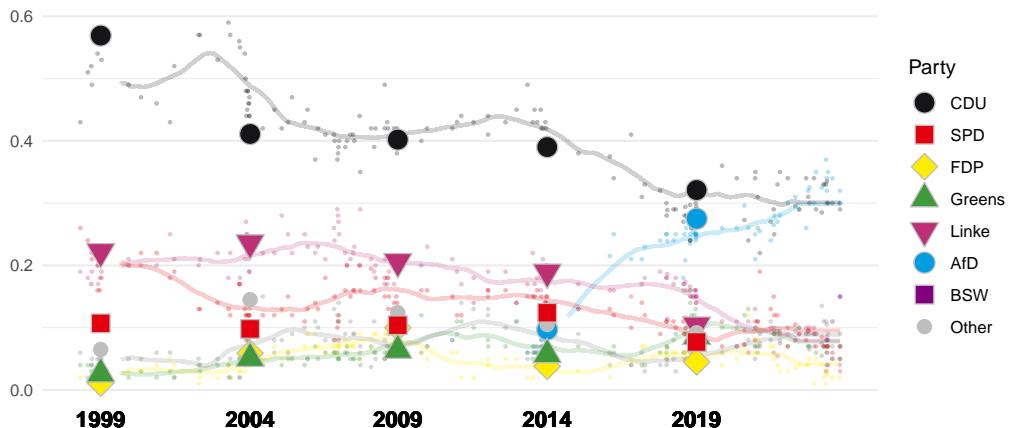
**Figure A.11.** Polls and election results over time for Schleswig-Holstein. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls.

## Polling and Election Results in Saarland



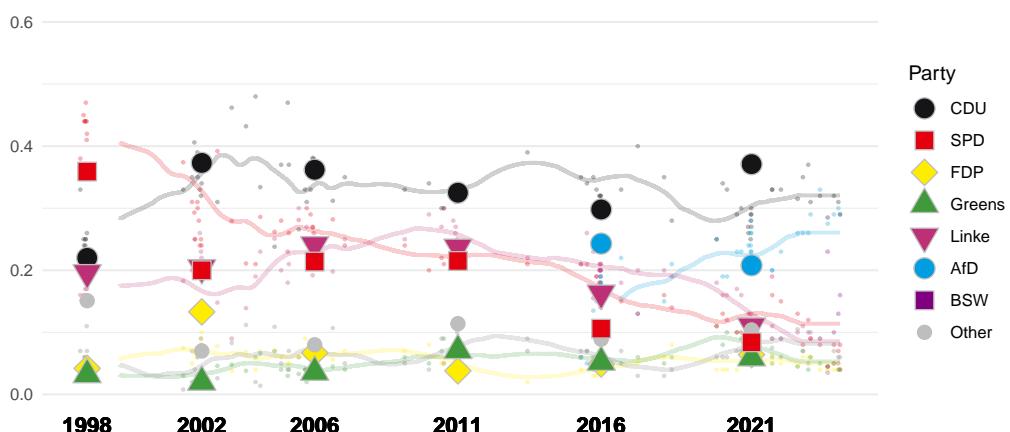
**Figure A.12.** Polls and election results over time for Saarland. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls.

### Polling and Election Results in Saxony



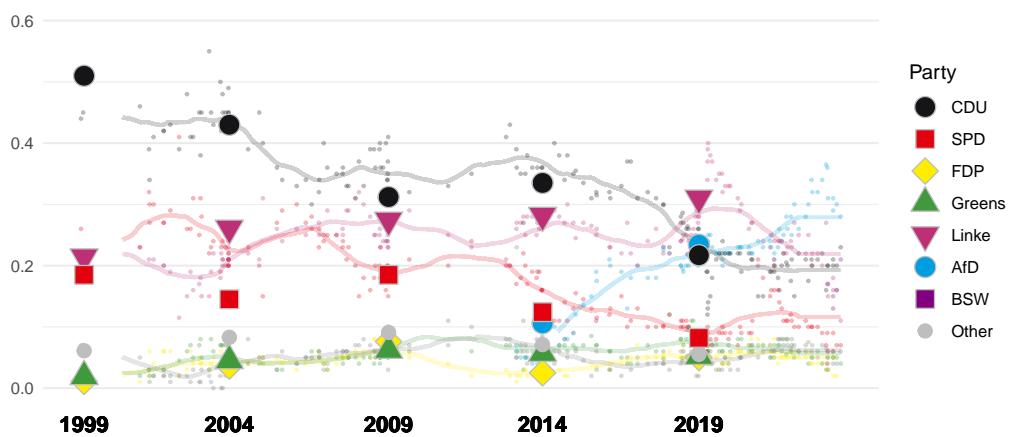
**Figure A.13.** Polls and election results over time for Saxony. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls.

### Polling and Election Results in Saxony-Anhalt



**Figure A.14.** Polls and election results over time for Saxony-Anhalt. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls.

## Polling and Election Results in Thuringia

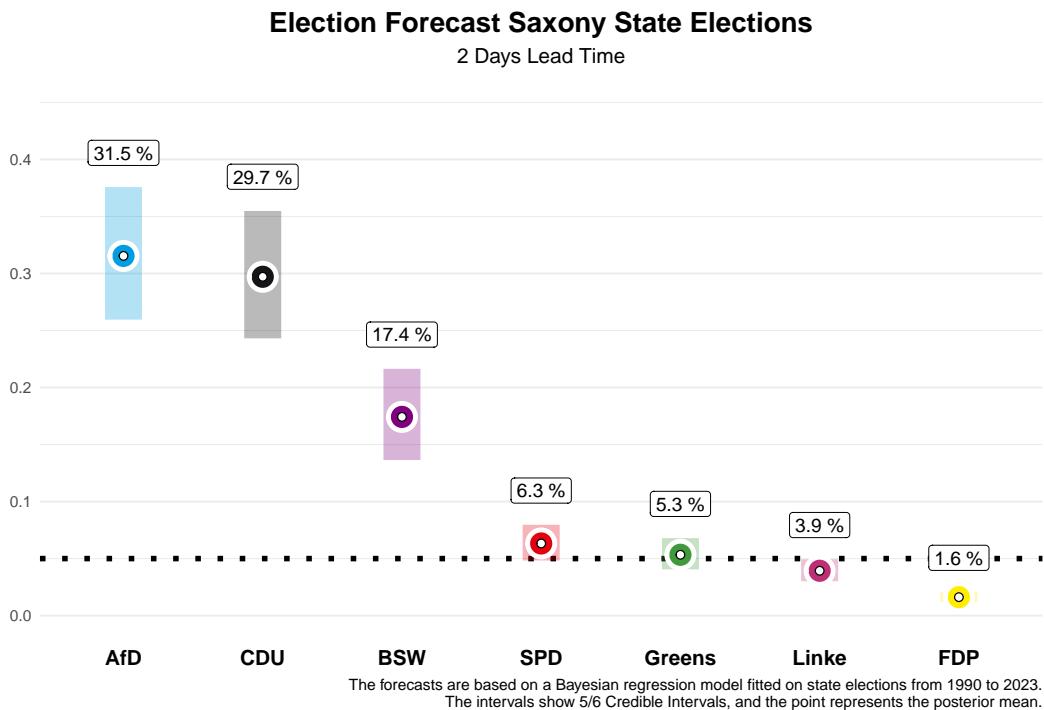


**Figure A.15.** Polls and election results over time for Thuringia. The symbols show the election results. The small dots show polling results between elections. The lines are 1000 day rolling averages of the polls.

## B. Forecasts with Different Lead Times

In the main text, we presented forecasts with a lead time of two weeks. Here we also present forecasts with lead times of two days and two months. The two-day lead forecasts were preregistered (OMIT-TED).

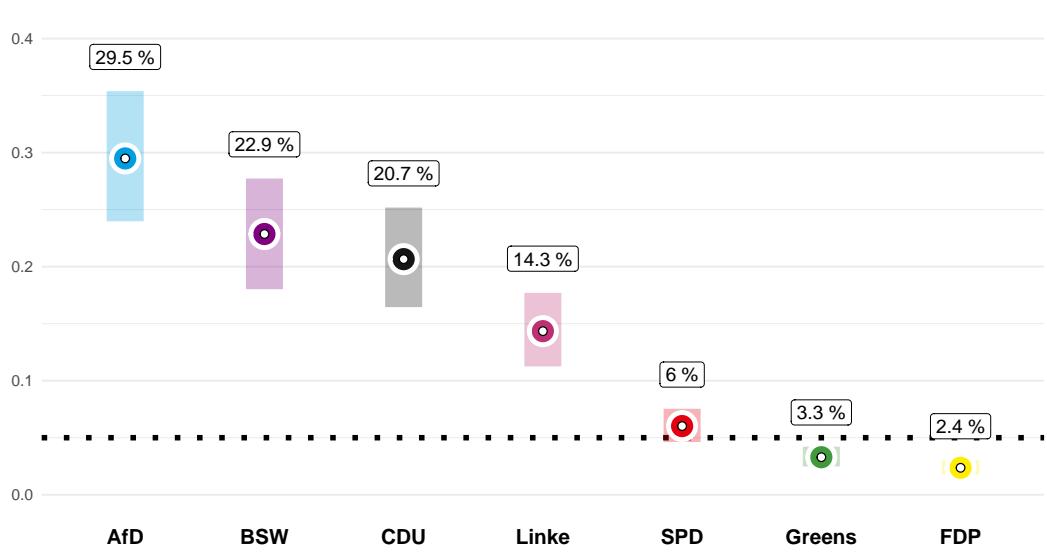
### B.1. Forecasts with Two Days Lead Time



**Figure B.16.** Ex-ante election forecast for the 2024 German state elections in Saxony with two days lead time. The bars represent the forecasted vote shares for each party, with the black lines indicating the 5/6 credible intervals.

## Election Forecast Thuringia State Elections

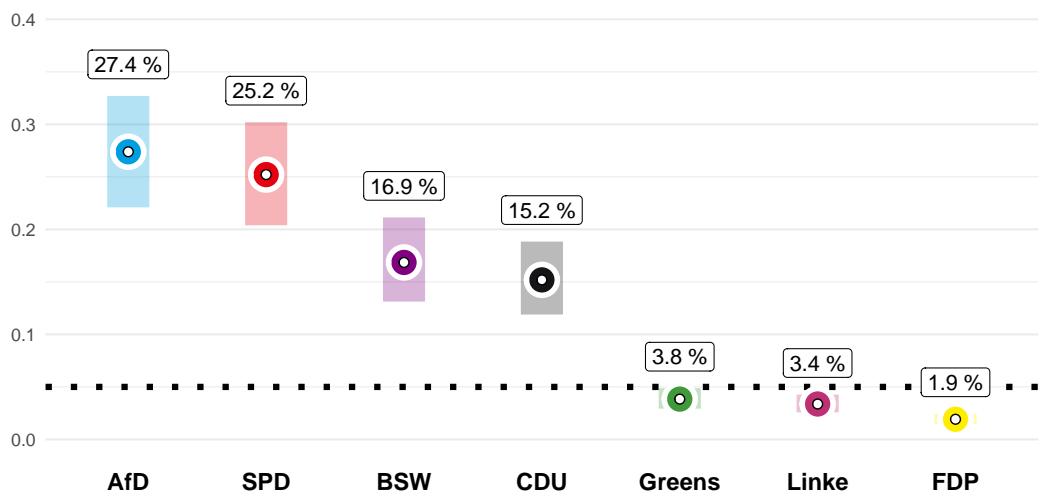
2 Days Lead Time



**Figure B.17.** Ex-ante election forecast for the 2024 German state elections in Thuringia with two days lead time. The bars represent the forecasted vote shares for each party, with the black lines indicating the 5/6 credible intervals.

## Election Forecast Brandenburg State Elections

2 Days Lead Time

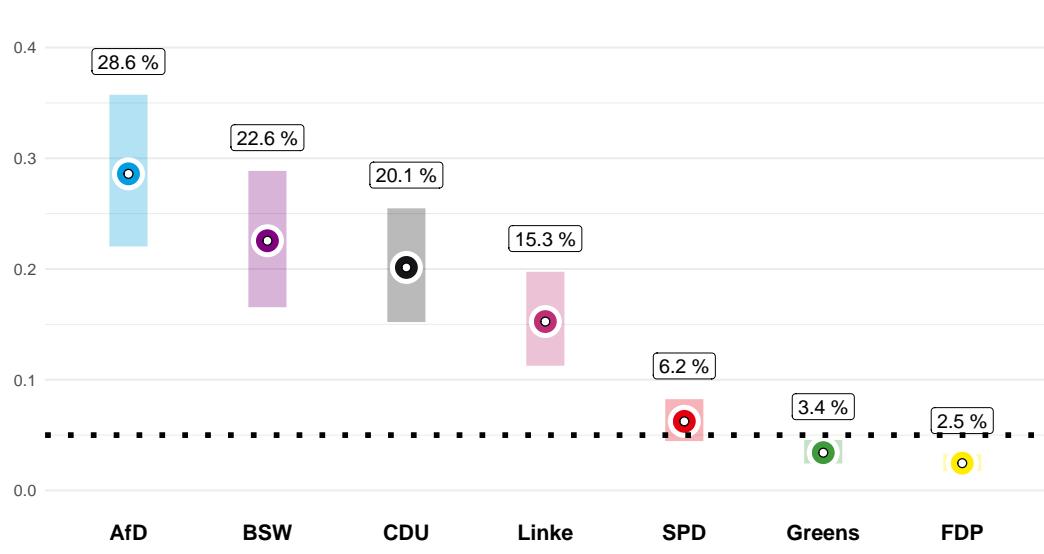


**Figure B.18.** Ex-ante election forecast for the 2024 German state elections in Brandenburg with two days lead time. The bars represent the forecasted vote shares for each party, with the black lines indicating the 5/6 credible intervals.

## B.2. Forecasts with Two Weeks Lead Time

### Election Forecast Thuringia State Elections

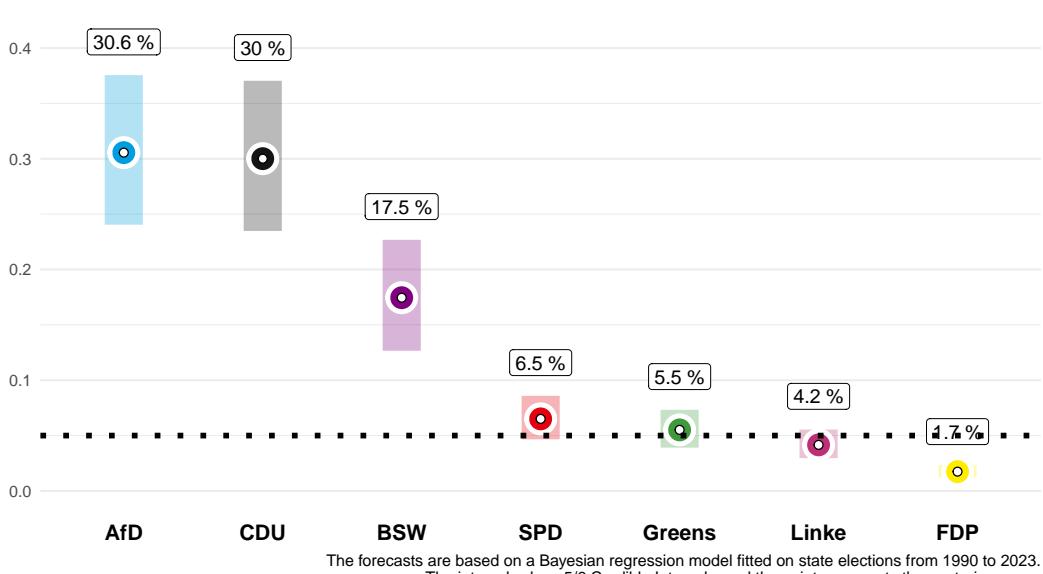
2 Weeks Lead Time



**Figure B.19.** Ex-ante election forecast for the 2024 German state elections in Thuringia with two weeks lead time. The bars represent the forecasted vote shares for each party, with the black lines indicating the 5/6 credible intervals.

## Election Forecast Saxony State Elections

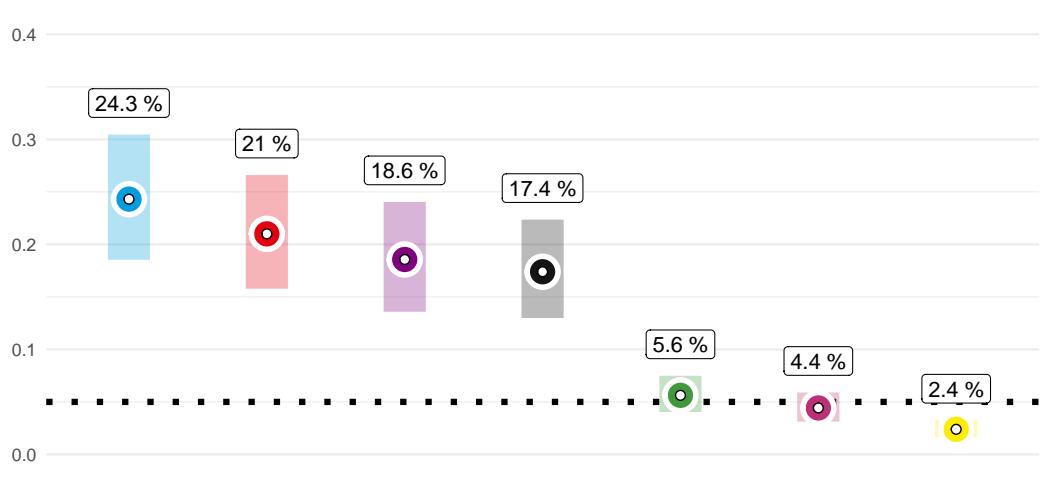
2 Weeks Lead Time



**Figure B.20.** Ex-ante election forecast for the 2024 German state elections in Saxony with two weeks lead. The bars represent the forecasted vote shares for each party, with the black lines indicating the 5/6 credible intervals.

## Election Forecast Brandenburg State Elections

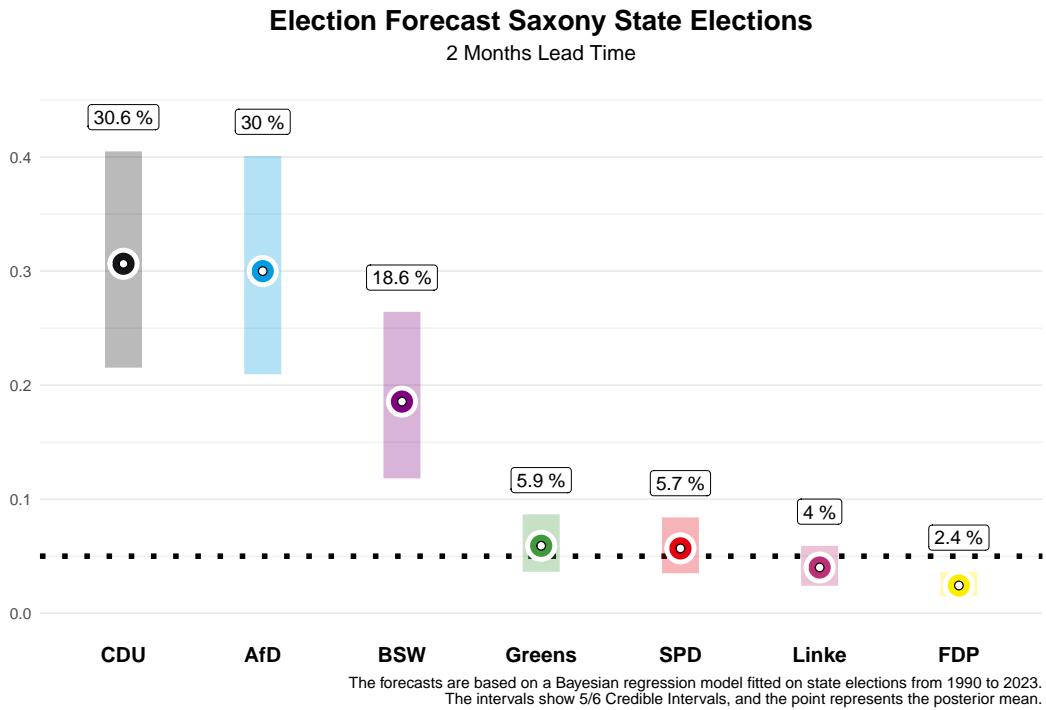
2 Weeks Lead Time



The forecasts are based on a Bayesian regression model fitted on state elections from 1990 to 2023.  
The intervals show 5/6 Credible Intervals, and the point represents the posterior mean.

**Figure B.21.** Ex-ante election forecast for the 2024 German state elections in Brandenburg with two weeks lead. The bars represent the forecasted vote shares for each party, with the black lines indicating the 5/6 credible intervals.

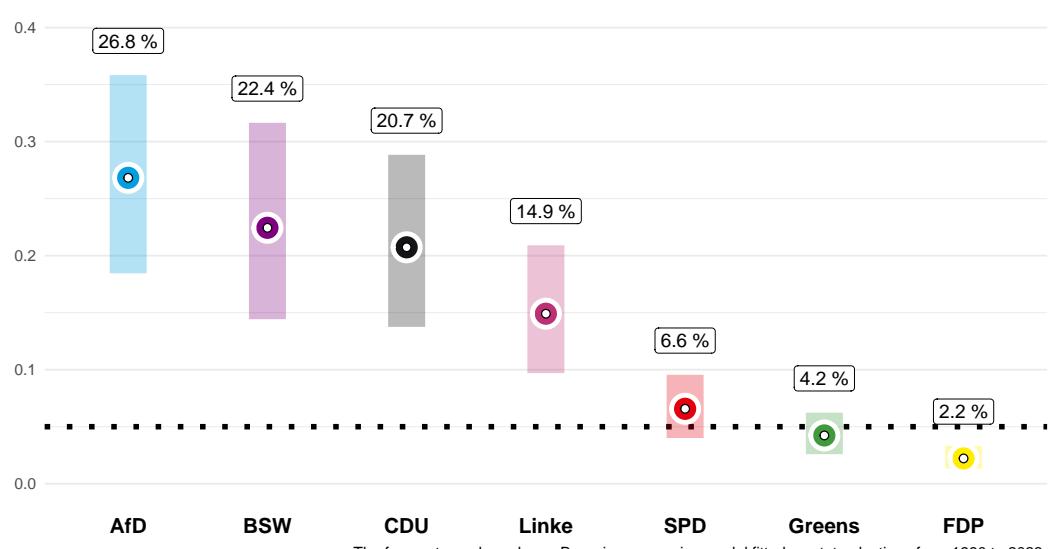
### B.3. Forecasts with Two Months Lead Time



**Figure B.22.** Ex-ante election forecast for the 2024 German state elections in Saxony with two months lead time. The bars represent the forecasted vote shares for each party, with the black lines indicating the 5/6 credible intervals.

## Election Forecast Thuringia State Elections

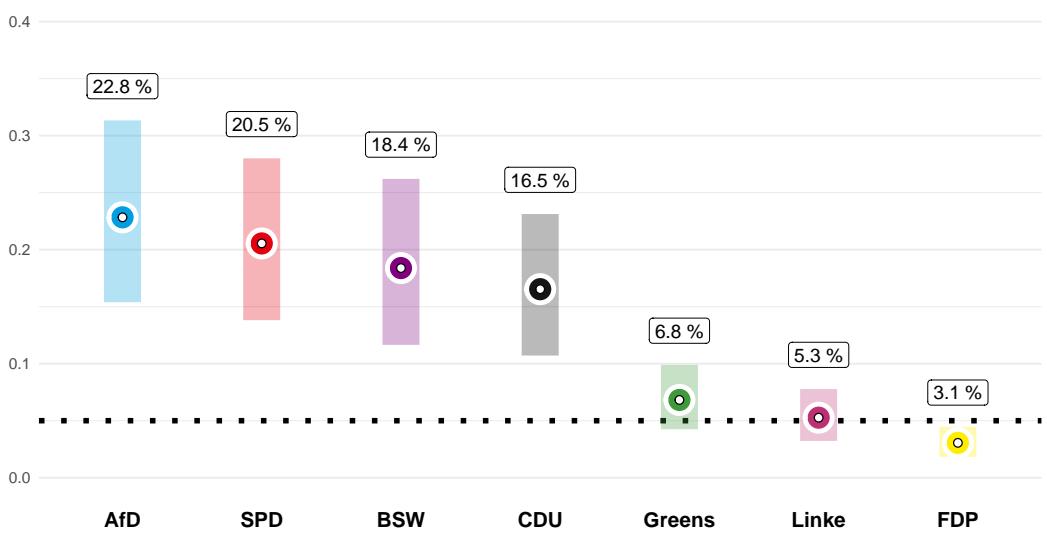
2 Months Lead Time



**Figure B.23.** Ex-ante election forecast for the 2024 German state elections in Thuringia with two months lead time. The bars represent the forecasted vote shares for each party, with the black lines indicating the 5/6 credible intervals.

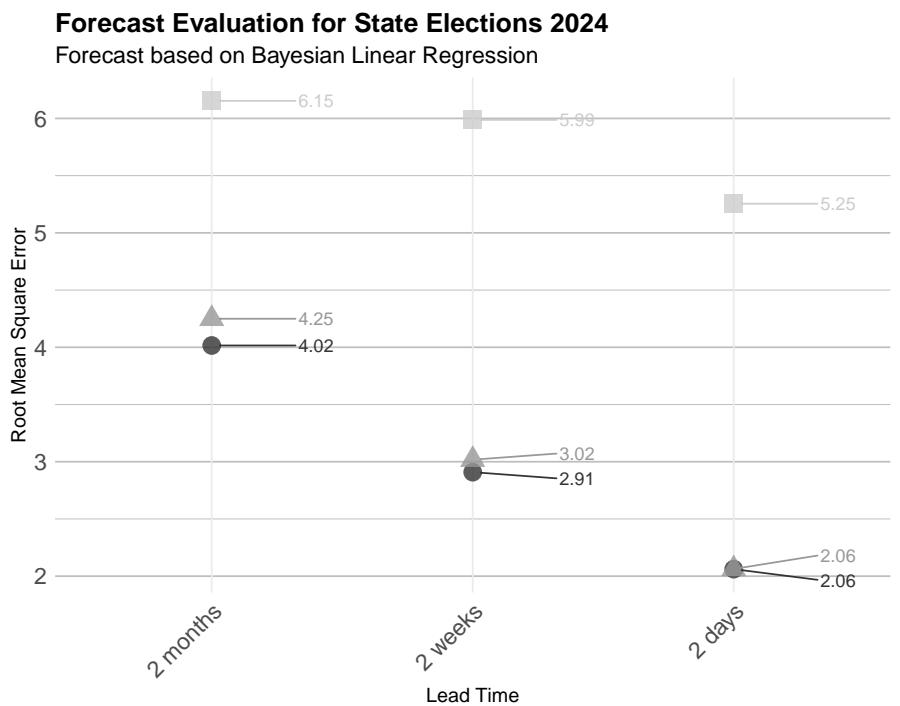
## Election Forecast Brandenburg State Elections

2 Months Lead Time



**Figure B.24.** Ex-ante election forecast for the 2024 German state elections in Brandenburg with two months lead time. The bars represent the forecasted vote shares for each party, with the black lines indicating the 5/6 credible intervals.

### C. Evaluation Based on Past Elections

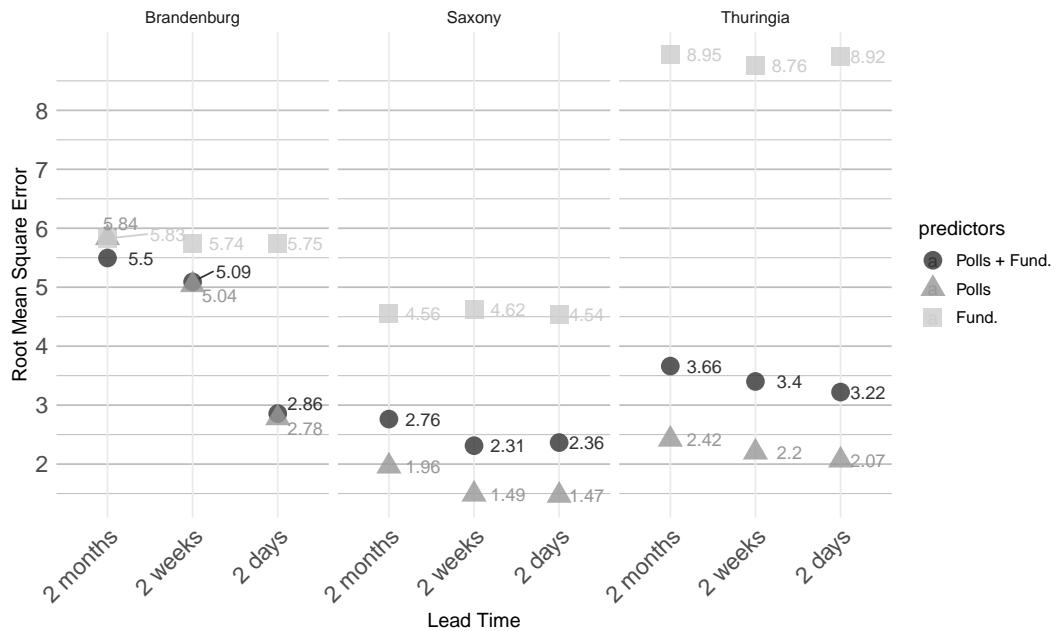


**Figure C.25.** Root Mean Square Error (RMSE) for the state elections from 2015 to 2023, comparing different model specifications. The RMSE values are calculated for forecasting models using different lead time (days, weeks, and months) prior to the election. This figure demonstrates the accuracy of the model's predictions over time, with lower RMSE values indicating better model performance.

## D. Evaluation Based of Ex-Ante Forecast for 2024

### Forecast Evaluation Forecast State Elections 2024

Forecast based on Bayesian Linear Regression



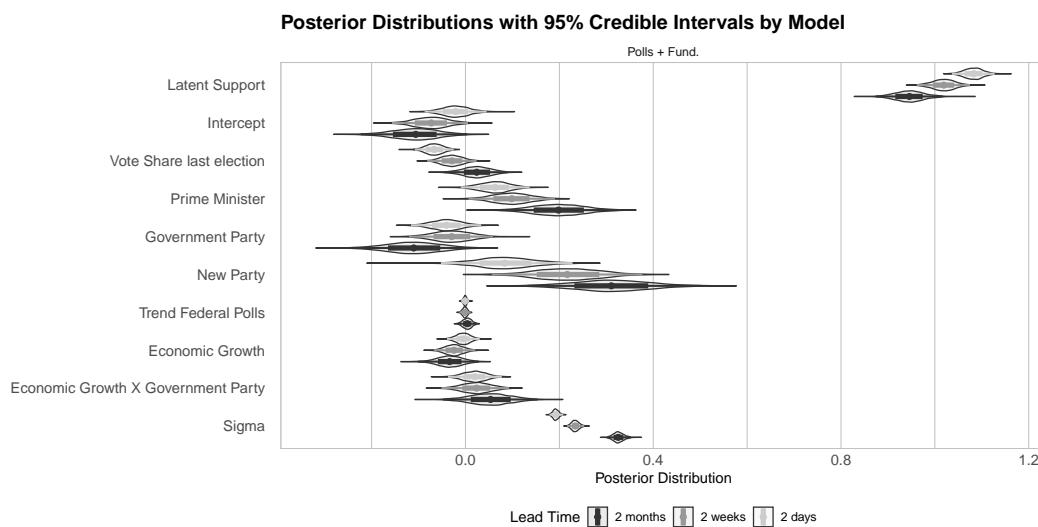
**Figure D.26.** Root Mean Square Error (RMSE) for the ex-ante forecast for the state elections 2024, comparing different model specifications. The MAE values are calculated for forecasting models using different lead time (days, weeks, and months) prior to the election. This figure demonstrates the accuracy of the model's predictions over time, with lower MAE values indicating better model performance.

## E. Models with Economic Performance

In this section, we present performance indicators for models that include additional variables capturing the economic conditions which might affect the electoral performance of government parties (Enns et al. 2024; Mongrain 2021). Specifically, these models additionally include growth as well as an interaction between growth and government participation. Growth is measured as the calendar and season adjusted change in real GDP. Otherwise, the models are identical to the ones presented in the main part. Table E.1 reports the average errors; compared to those from the models without economic variables, the mean errors indicate that there is little difference in performance when including these variables. Figure E.27 shows the posterior distributions which fall close to zero for the economic growth variables.

**Table E.1.** Out-of-sample performance for models including GDP growth.

Predictors	Lead	MAE	RMSE
Polls	2 days	1.49	2.06
Polls + Fund.	2 days	1.45	2.07
Polls + Fund.	2 weeks	2.17	2.94
Polls	2 weeks	2.24	3.02
Polls + Fund.	2 months	3.11	4.04
Polls	2 months	3.21	4.25
Fund.	2 days	3.64	5.12
Fund.	2 weeks	4.31	5.82
Fund.	2 months	4.5	6.07



**Figure E.27.** Posterior distributions for the predictors along with their credible intervals across models.

## References

- Enns, Peter K, Jonathan Colner, Anusha Kumar, and Julius Lagodny. 2024. Understanding biden's exit and the 2024 election: the state presidential approval/state economy model. *PS: Political Science & Politics*, 1–8.
- Mongrain, Philippe. 2021. 10 downing street: who's next? seemingly unrelated regressions to forecast uk election results. *Journal of Elections, Public Opinion and Parties* 31 (1): 22–32.